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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,619	06/23/2003	Jong-Pyng Chen	0941-0761P	6841

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EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	**PAPER NUMBER**
1745	

NOTIFICATION DATE	DELIVERY MODE
07/24/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/600,619	CHEN ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4 and 6-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4 and 6-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Claim Rejections - 35 USC § 103

2. Claims 1, 2, 4, 6-8 and 11-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rajendran (U.S. Patent 5,981,097) in view of WO 96/29752 in view of Asukabe et al (U.S. Pre-Grant Publication No. 2001/0026893).

The Rajendran reference is directed to a cation exchange membrane having at least three layers. Each layer comprises a cation exchange polymer (see abstract). As disclosed in column 4, line 22, inorganic filler may be incorporated into some or all of the layers of the membrane. It is further taught that if the filler is used in only one layer, it is preferable for the surface layer facing the anode to contain the filler. The filler may be that as described in WO 96/29752 (see col. 4, line 22 of Rajendran). Such materials include proton conductors such as zeolite, hydrogen modenite, and zirconium phosphate (see page 9 of WO '752). Regarding claims 7 and 8, the organic polymer may comprise fluorine-containing resin such as PVDF (see col. 3, line 47). The laminated membrane is used as the electrolyte in a direct methanol fuel cell (see col. 3, line 8). Regarding claims 13 and 14, WO '752 teaches that the inorganic conductor is doped (i.e., physically blended) into the organic polymer (see Example 2). Regarding claim 15, Rajendran teaches that the layered structure is formed by laminating under heat and pressure (see col. 6, line 2). Regarding claim 18, cation exchange groups can be introduced after lamination is performed (see col. 6, line 13).

Rajendran does not expressly teach the methanol permeability and proton conductivity values recited in claims 11, 12, 20, and 21.

However, it is submitted that the artisan would be sufficiently guided to optimize these values, thereby rendering the claimed ranges obvious. In column 2, line 60, the reference teaches that "in a fuel cell in accordance with the invention, methanol crossover is substantially reduced, up to about 50% when preferred membranes are employed." Thus, a low methanol permeability is a goal of the invention and the artisan would be guided to achieve a low value of the methanol permeability. Furthermore, the artisan would be motivated to optimize the proton conductivity of the membrane while keeping the methanol permeability at a relatively low value. Accordingly, the claimed ranges are not considered to distinguish over the reference.

Regarding claim 17, it would be obvious to perform the lamination step using an adhesive, especially if the selected polymer(s) lack the necessary adhesiveness to properly form the layered membrane. As such, claim 17 is not considered to distinguish over the reference.

Rajendran further does not expressly teach that the base polymer comprises PVDF-g-SPS, as recited in claims 1, 13, and 19.

Asukabe et al. is directed to a polymer electrolyte membrane comprising, among other materials, PVDF-g-SPS (see pars. 33 and 34).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the PVDF-g-SPS of Asukabe et al. in the membrane of Rajendran. In paragraph 36, the Asukabe reference lists numerous advantages of the invention, including good electrode adherence, easy humidification, and excellent stability. As such, the artisan would be motivated to use the PVDF-g-SPS of Asukabe et al. in the membrane of Rajendran.

3. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rajendran in view of WO 96/29752 in view of Asukabe et al as applied to claims 1, 2, 4, 6-8 and 11-21 above, and further in view of Murphy et al (U.S. Patent 6,059,943).

Rajendran does not expressly teach that the base polymer further comprises a non-fluorinated polymer such as polysulfone, as recited in claims 9 and 10.

Murphy et al. is directed to an organic/inorganic electrolyte membrane that may comprise, among other materials, PVDF and polysulfone (see col. 8, line 65).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the polysulfone of Murphy et al. in the membrane of Rajendran. The disclosure of Murphy et al. suggests that the polymers listed at column 8, line 59, including polysulfone and PVDF, are functionally equivalent for use in a hybrid organic/inorganic PEM. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06. As such, it would be obvious to use polysulfone in the membrane of Rajendran.

Response to Arguments

4. Applicant's arguments filed July 11, 2007 have been fully considered but they are not persuasive. Applicants state that Rajendran teaches copolymers containing a first fluorinated monomer and a second fluorinated monomer, and thus "teaches away" from using a material such as PVDF-g-SPS having a non-fluorinated second monomer. However, this argument is not

persuasive. The disclosure of Rajendran appears to be silent with regard to non-fluorinated monomers per se. However, such silence should not be construed as a "teaching away" as asserted by applicants. In column 3, line 26, Rajendran teaches that "[p]referably, the polymer in accordance with the invention is highly fluorinated." Further, the reference discloses homopolymers or copolymers containing specific fluorinated monomers as being "possible highly fluorinated polymers." However, the skilled artisan would view the disclosure of the specific monomers as being merely exemplary, and not limiting of the invention of Rajendran. It is submitted that the "highly fluorinated" polymers of the reference include a broad class of materials, including copolymers having non-fluorinated monomers, and as such the reference should not be construed as "teaching away" from non-fluorinated monomers. In this case, with regard to Asukabe et al., the skilled artisan would also be able to manipulate the ratio of the vinylidene fluoride and the styrene monomers in the copolymer so as to obtain a "highly fluorinated" material as taught by Rajendran. As such, there is not believed to be a "teaching away" from materials such as PVDF-g-SPS as disclosed by Asukabe, and the rejection as stated above is still believed to be proper.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JC

Jonathan Crepeau
Primary Examiner
Art Unit 1745
July 19, 2007